



First record of the caddisfly *Notidobiella amazoniana* Holzenthal & Blahnik, 2010 (Trichoptera, Sericostomatidae) from Roraima state, northern Brazil

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Abstract

Notidobiella amazoniana Holzenthal & Blahnik, 2010 was known only from the type locality in Amazonas state, Brazil. Herein, we provide the first record of *N. amazoniana* for Roraima state, thus extending the geographic range of this species to the northernmost state of Brazil. Its occurrence in Roraima also represents the first record of the family Sericostomatidae for the state and the most northern record of the genus in South America. Information on the holotype of *N. amazoniana* and a distribution map for all species of *Notidobiella* are provided.

Keywords

Amazon basin, aquatic insects, conservation, distribution, Serra da Mocidade, South America, taxonomy.

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Introduction

The caddisfly family Sericostomatidae occurs in all biogeographic regions except the Australasian region (Holzenthal et al. 2007). Currently, the family contains 103 extant species in 16 genera, with about half of the species occurring in the western Palearctic (Johanson et al. 2016; Morse et al. 2019). In the Neotropics, Sericostomatidae is represented by three genera: *Grumicha* Müller, 1879 with one species from southeastern and southern Brazil and northeastern Argentina; *Gumaga* Tsuda, 1938 with one species from Baja California, Mexico; and *Notidobiella* Schmid, 1955 with six species from Chile, Brazil, and Ecuador (Johanson et al. 2016; Holzenthal and Calor 2017).

Notidobiella was originally described by Schmid

(1955) for its type species, *N. parallelipipeda* Schmid, 1955, which was based on a male individual from Nuble province, Chile. Later, *N. chacayana* Schmid, 1957 was described from Maule province, Chile, followed by a third Chilean species, *N. inermis* Flint, 1983 from Cautín province. Recently, the genus was revised by Holzenthal and Blahnik (2010), who described three more new species: *N. amazoniana* Holzenthal & Blahnik, 2010 and *N. brasiliana* Holzenthal & Blahnik, 2010, both from Brazil, and *N. ecuadorensis* Holzenthal & Blahnik, 2010, from Ecuador.

The genus is characterized in the adult stage by the very short maxillary palps that are five-segmented and unmodified in the female, but two-segmented and

modified in the male, with an enlarged, heavily setose basal article held against the face and sclerotized on its lateral side only, membranous on the medial side, with a much smaller, oval, sclerotized, and setose apical article. A posteromesal process on sternum VII, which is present in males, is also characteristic (Schmid 1955; Holzenthal and Blahník 2010). In Sericostomatidae, the tibial spur formula 2-2-2 is unique for *Notidobiella* (Johanson et al. 2016). The larva and pupa are known only for *N. chacayana*, which was described by Flint (1967) from a metamorphotype, which means that color, setation, and other common diagnostic characters still are unknown for this species. The larvae of the genus are recognized by their slightly tapered and curved cases, which are constructed of small mineral fragments embedded in silk. They are found in small streams and probably are detritivores (Holzenthal and Blahník 2010; Holzenthal and Calor 2017).

Despite the recent discovery and description of many new species of Trichoptera in Roraima state (Gama Neto et al. 2017; Alves et al. 2018; Gama Neto and Passos 2018, 2019), the two *Notidobiella* species occurring in Brazil, *N. amazoniana* and *N. brasiliensis*, are known only from Amazonas and São Paulo states, respectively (Santos et al. 2020). Thus, we provide here the first record of *N. amazoniana* from Roraima state, northern Brazil. Information on the holotype of *N. amazoniana* and a distribution map for all species of *Notidobiella* are provided (Fig. 1).

Methods

Recently, during an aquatic insect survey in Serra da Mocidade National Park, a single male specimen of *Notidobiella amazoniana* was collected. Serra da Mocidade National Park covers about 376,000 ha of rainforest in the extreme northern Brazilian Amazon, within the limits of Caracaraí municipality, Roraima state. The park is in one of the most isolated and inaccessible areas of the state and comprises part of a complex of mountain ranges isolated from other highland mountains in the Shield of the Guianas (MMA 2016). The specimen was found at a first order stream, it was captured with a Pennsylvania light trap (Frost 1957) and preserved in 80% ethanol.

To observe male genital structures, the abdomen was removed and cleared in a heated solution of 10% KOH as detailed by Blahník and Holzenthal (2004). After clearing, the genitalia were examined under a Leica DM5500 B compound microscope; they were then stored in glycerin in a microvial together with the remains of the dissected specimen stored in a plastic vial with 80% ethanol.

The male adult and forewing were photographed with a Leica DMC4500 video camera attached to a Leica M205A stereomicroscope using an LED illumination dome. Stacks of images of each structure were produced at different focal distances and then combined automatically into a single image with a greater depth of field



Figure 1. Geographical distribution of *Notidobiella* species in South America.

using Helicon Focus® (version 6.7.1 Pro) stacking software. Figures were assembled using Adobe Photoshop® (version CS6).

The specimen was identified by comparison to the original description of Holzenthal and Blahník (2010) and the holotype housed at the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas, Brazil, where the newly collected specimen also is deposited. Morphological terminology also follows Holzenthal and Blahník (2010).

The map showing the geographical distribution of all the species of *Notidobiella* was created using QGIS Las Palmas 2.18.10 software (QGIS Development Team 2016). Previous records of the species were taken from the literature, and for those without geographical coordinates, we used Google Earth® to locate the approximate collection site.

Results

Notidobiella amazoniana Holzenthal & Blahník, 2010 Figures 1–3

Notidobiella amazoniana Holzenthal and Blahník 2010: 28, fig. 8.
Type locality: Brazil, Amazonas, AM 010, km 246. Paprocki and França 2014: 92 (checklist); Holzenthal and Calor 2017: 449 (catalog).

Materials examined. BRAZIL • 1♂; Roraima, Caracaraí, Serra da Mocidade National Park, Igarapé do

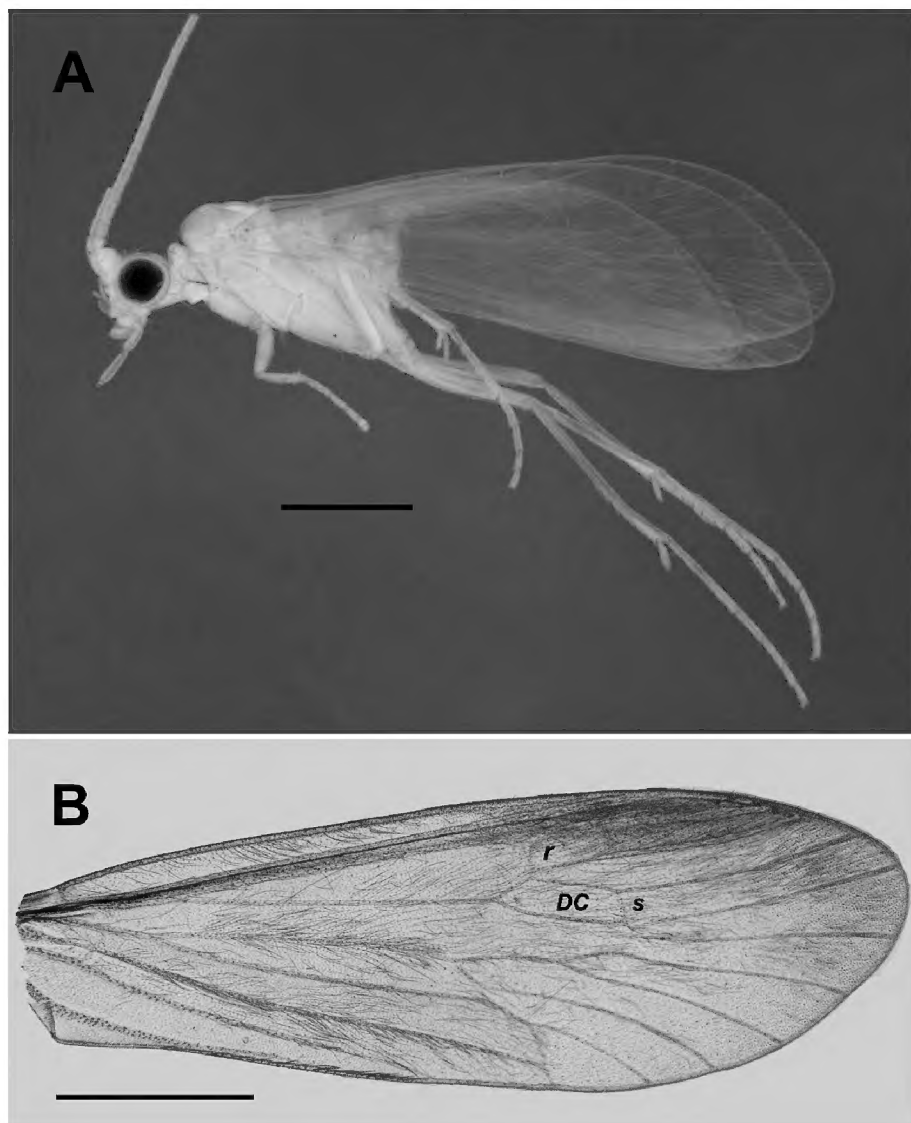


Figure 2. *Notidobiella amazoniana* Holzenthal & Blahnik, 2010, specimen from Roraima state. **A.** Left habitus. **B.** Left forewing, dorsal view. Abbreviations: DC = discoidal cell; *r* and *s* = crossveins. Scale bars = 1 mm.

Banho; 01°42'23.3"N, 061°47'02.1"W; 1078 m a.s.l.; 30–31 Jan. 2016; JMC Nascimento leg.; INPA-TRI 000045 (Fig. 2A, B) • 1♂, holotype; Amazonas, AM 010, km 246; 15–16 Jul. 1979; J. Arias leg.; INPA-TRICH 0012, UMSP000131226 (Fig. 3A, B).

Identification. *Notidobiella amazoniana* is easily distinguished from all its congeners by having the inferior appendage elongate, narrow throughout its length and without a mesal process on its ventromesal margin; and by the single, short, triangular, posteromesal process on abdominal sternum IX, instead of the paired processes as in the other species. Furthermore, it is the smallest species in the genus, with the forewing length 4.5–5 mm (Fig. 2B), whereas in the other species the length of the forewing ranges from 6 to 8 mm.

Remarks. Our specimen (Fig. 2A) clearly is the same species as the holotype (Fig. 3A, B). In the original description of *N. amazoniana*, Holzenthal and Blahnik (2010) described and illustrated the forewing without crossveins *r* and *s*, with the absence of crossvein *s* leaving the discoidal cell open (see Holzenthal and Blahnik 2010: fig. 7A). However, in examining the holotype, we discovered that crossveins *r* and *s* are present, but weakly marked (Fig. 3B) and difficult to discern, as already observed by Holzenthal and Blahnik (2010) for *N. ecuadorensis*, which also has the discoidal cell closed.

Geographical distribution (Fig. 1). Amazonas and Roraima, Brazil.

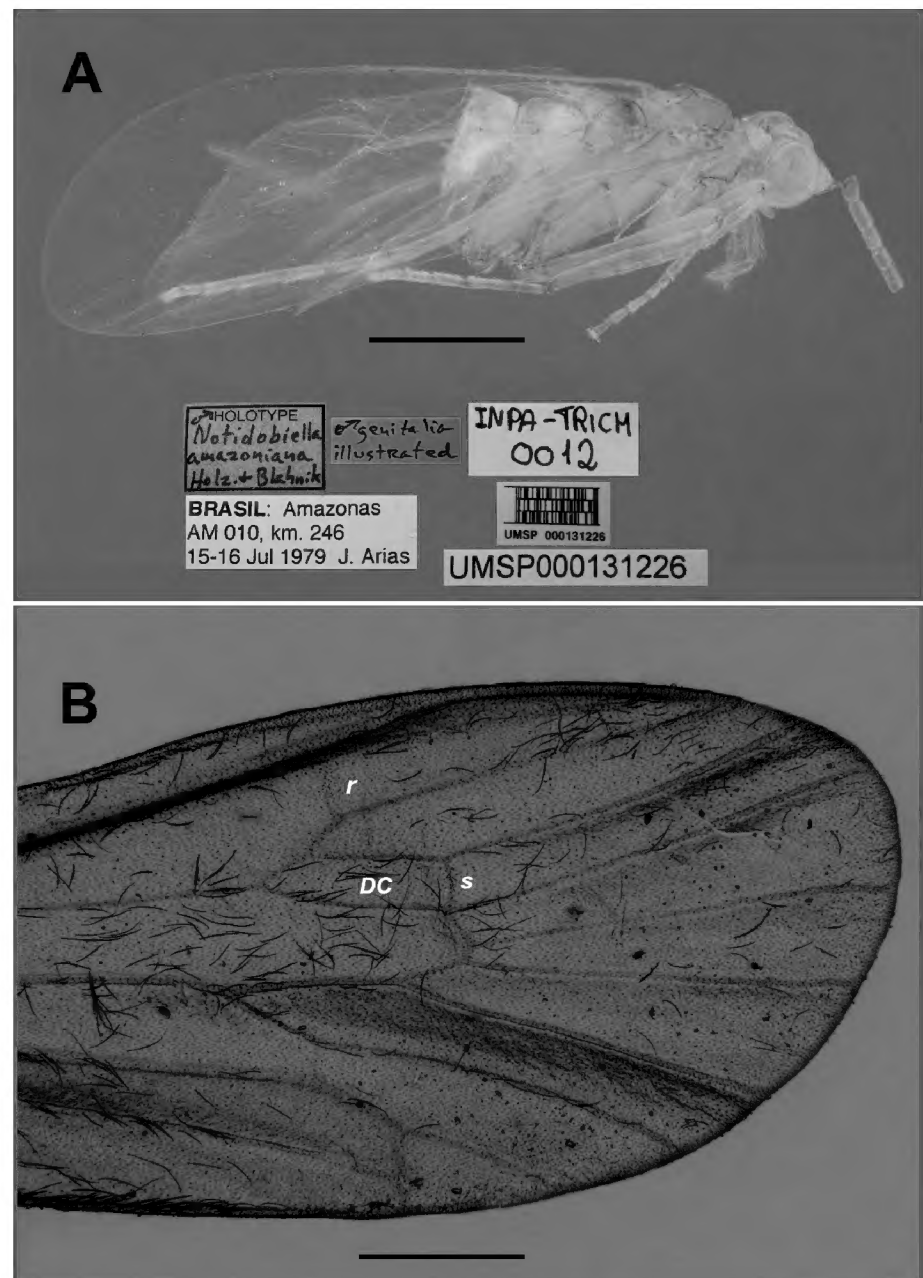


Figure 3. *Notidobiella amazoniana* Holzenthal & Blahnik, 2010, holotype. **A.** Right habitus and labels. **B.** Apical half of left forewing, dorsal view. Abbreviations: DC = discoidal cell; *r* and *s* = crossveins. Scale bars: A = 1 mm; B = 0.5 mm.

Discussion

The genus *Notidobiella* was previously believed to be endemic to southern Chile. However, after the revisionary work by Holzenthal and Blahnik (2010), the geographic distribution of this genus was extended well beyond the Chilean subregion to the northeastern part of the Brazilian subregion and northern South America.

To date, the Brazilian species of the genus have disjunct distributions and are known only from their type localities, with *N. brasiliensis* from the Atlantic Forest of the São Paulo state, southeastern region, and *N. amazoniana* from the Amazon Central in the Amazonas state, northern region (Holzenthal and Blahnik 2010), more specifically an area of forest located near Manaus city. We extend the geographic distribution of *N. amazoniana* in the Brazilian Amazon with the first record for Roraima state, about 600 km from this species' type locality. The occurrence of *N. amazoniana* in the Roraima state also represents the first record of the genus and the family Sericostomatidae for the state and the northernmost record of the genus in the South America. The known distribution of *N. amazoniana* is restricted to the Amazon basin.

Finally, the new record of the rare caddisfly *N. amazoniana* in the Serra da Mocidade National Park highlights the continuing need for efforts to conserve the park

and to conduct more studies on the caddisfly fauna of the Brazilian Amazon. Because the Serra da Mocidade is in one of the most remote and isolated portions of the Amazonia biome, with difficult access, the discovery of new records and species of caddisflies is highly expected.

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Authors' Contributions

GRD analyzed the specimens, produced the photographs and maps, and wrote the paper; AMP reviewed drafts of the paper.

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